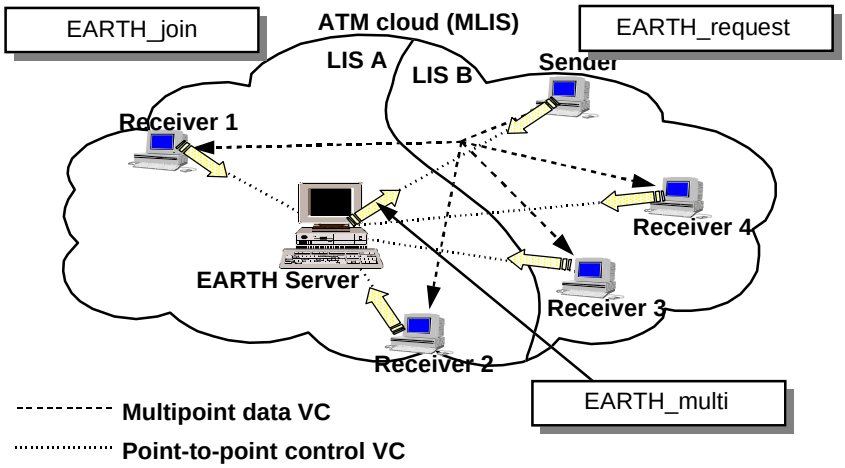
Supporting IP Multicast Integrated Services in ATM Networks

L. Salgarelli and A. Corghi, CEFRIEL
{salga, corghi}@cefriel.it
D. Witaszek and H. Sanneck, GMD Fokus
{witaszek, sanneck}@fokus.gmd.de

Overview

- Introduction
- IP Multicast over ATM: EARTH
- Internet Integrated Services over ATM: Issues
- Integrated Approach: Multicast Integration Server (MIS)
- Service model: quantized heterogeneity
- RSVP server
- RSVP state modification at the MIS
- Sequence of events to establish a QoS point-to-multipoint VC
- Conclusions

IP Multicast over ATM: EARTH

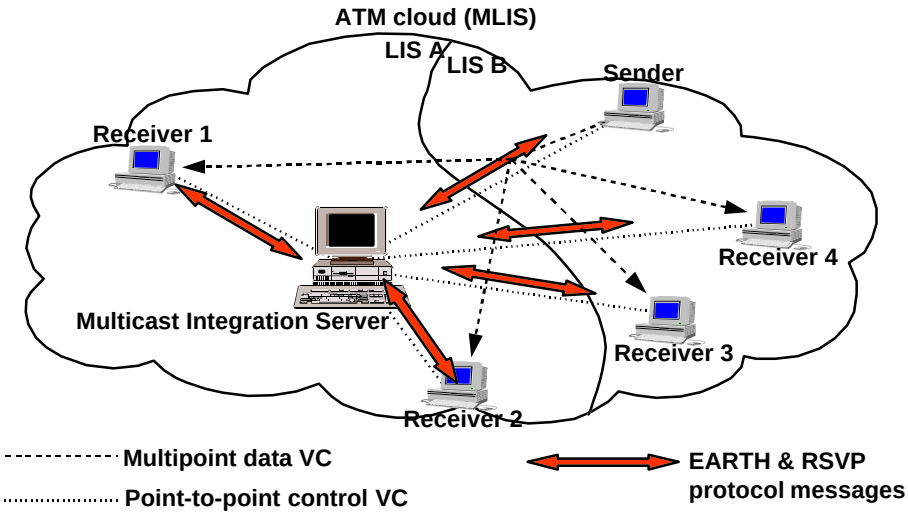


- IP Multicast / ATM address resolution for *Multicast LIS*: shortcuts
- support of *source-specific groups* (IGMPv3) and *Layer 2 QoS* information

Internet Integrated Services (IIS) over ATM: Issues

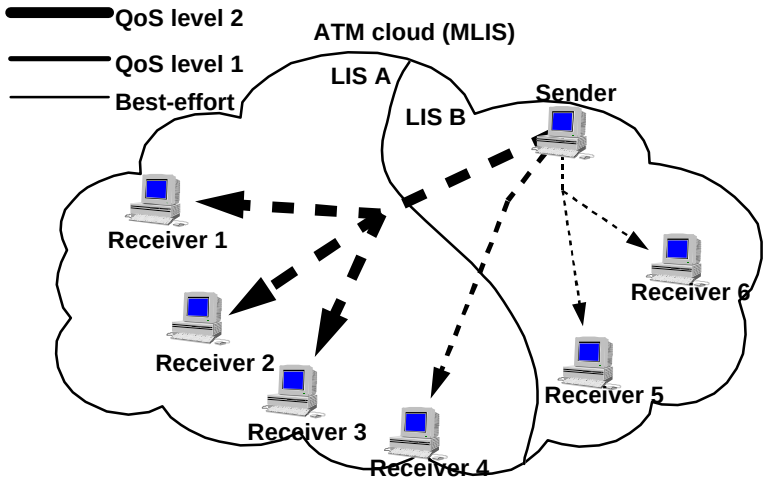
- service class mapping
  solved issue (e.g. IIS Guaranteed service to ATM CBR/rt-VBR)
- Receiver heterogeneity:
  limited (VC space consumption, data duplication)
- dynamic QoS renegotiation:
  end-to-end VC setup necessary
- RSVP merging:
  only at edges of the ATM cloud
- shortcuts:
  transport of ATM addresses with RSVP,
  RSVP messages still travel hop-by-hop

Integrated approach: Multicast Integration Server (MIS) 5



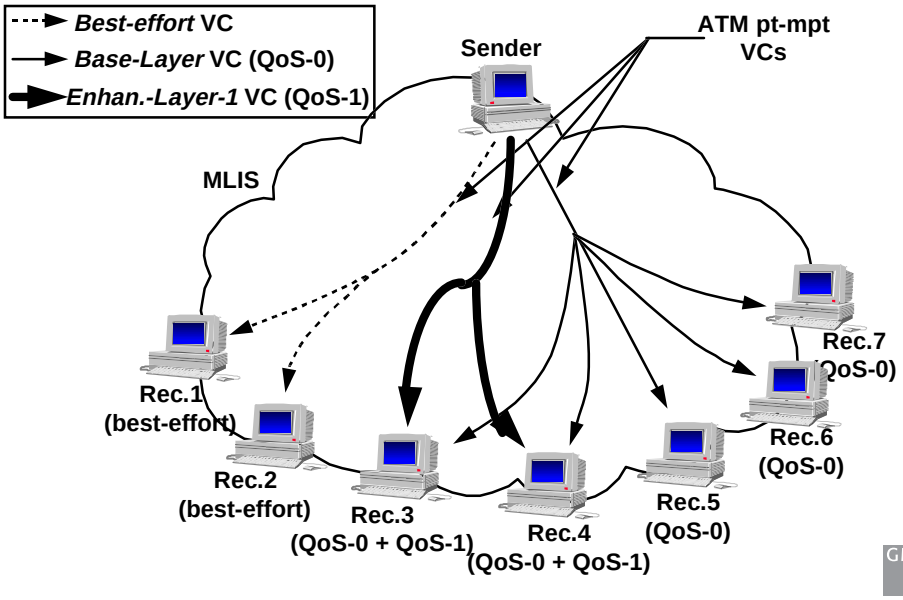
• Joint client/server operation of RSVP and EARTH protocols within MLIS

Service model: Quantized Heterogeneity 6

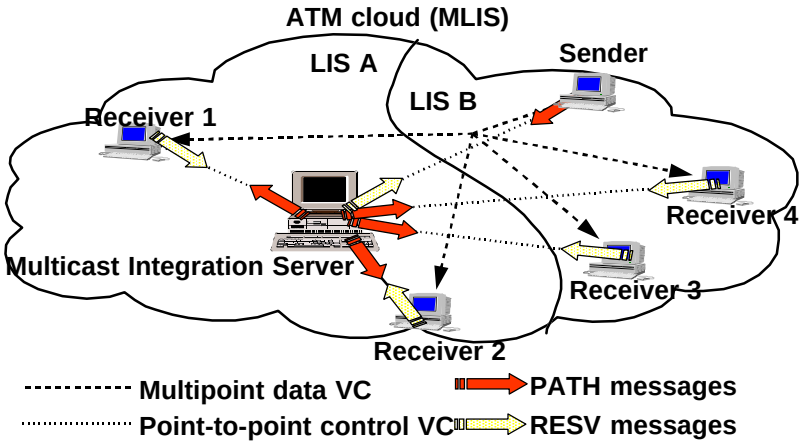


• support for a limited number of *QoS levels*
(QoS level: pre-defined set of QoS parameters)

Quantized heterogeneity: support for layered flows



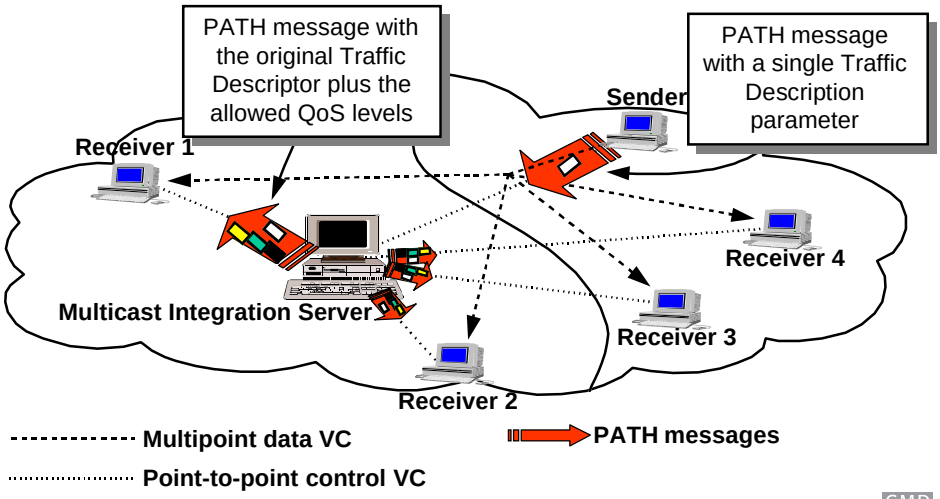
RSVP operation within the MLIS: client/server



- efficient PATH state distribution, RESV merging
- interface to EARTH QoS capabilities

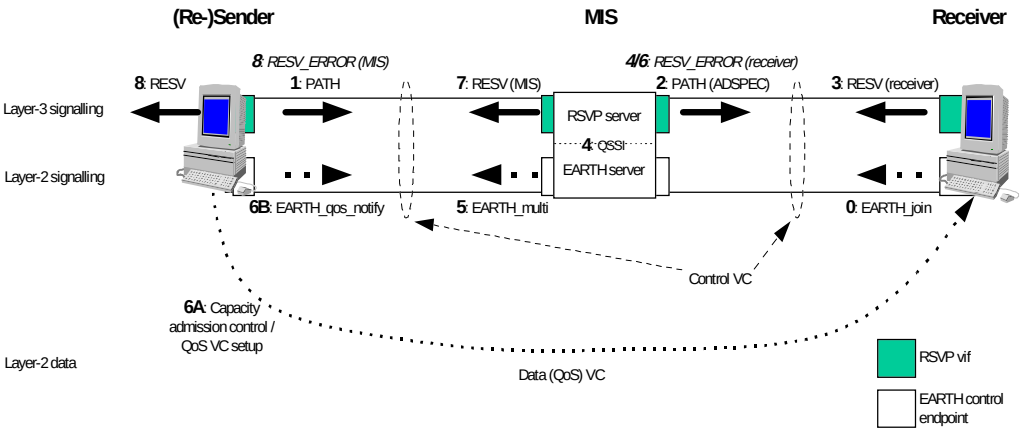
RSVP operation: state modification at the MIS

Example: introducing the quantized heterogeneity model



- Any administrative policy can be enforced at the MIS

Sequence of events to establish a pt-mpt VC



- RSVP/EARTH interface only at ther server: QSSI (**4**)
- remote Layer 2 capacity admission control (**5**, **6**) = ATM VC setup

Conclusions

- Shortcut support for multicast flows (minimizes Layer 3 processing and resending identical data through the switch due to LIS boundaries)
- *joint operation* of Layer 2 (EARTH) and Layer 3 protocol (RSVP), however with a strict *functional separation*
- RSVP: no changes to protocol semantics
  (additional protocol objects, modified Traffic Control Interface, centralized merging point: reduced protocol overhead, policy enforcement)
- Quantized heterogeneity model:
  supports scalability (VC space, data duplication) and layered flows
- Very large clouds: need to setup multiple servers with SCSP coordination
- Future work: interworking to Multilayer Routing clouds